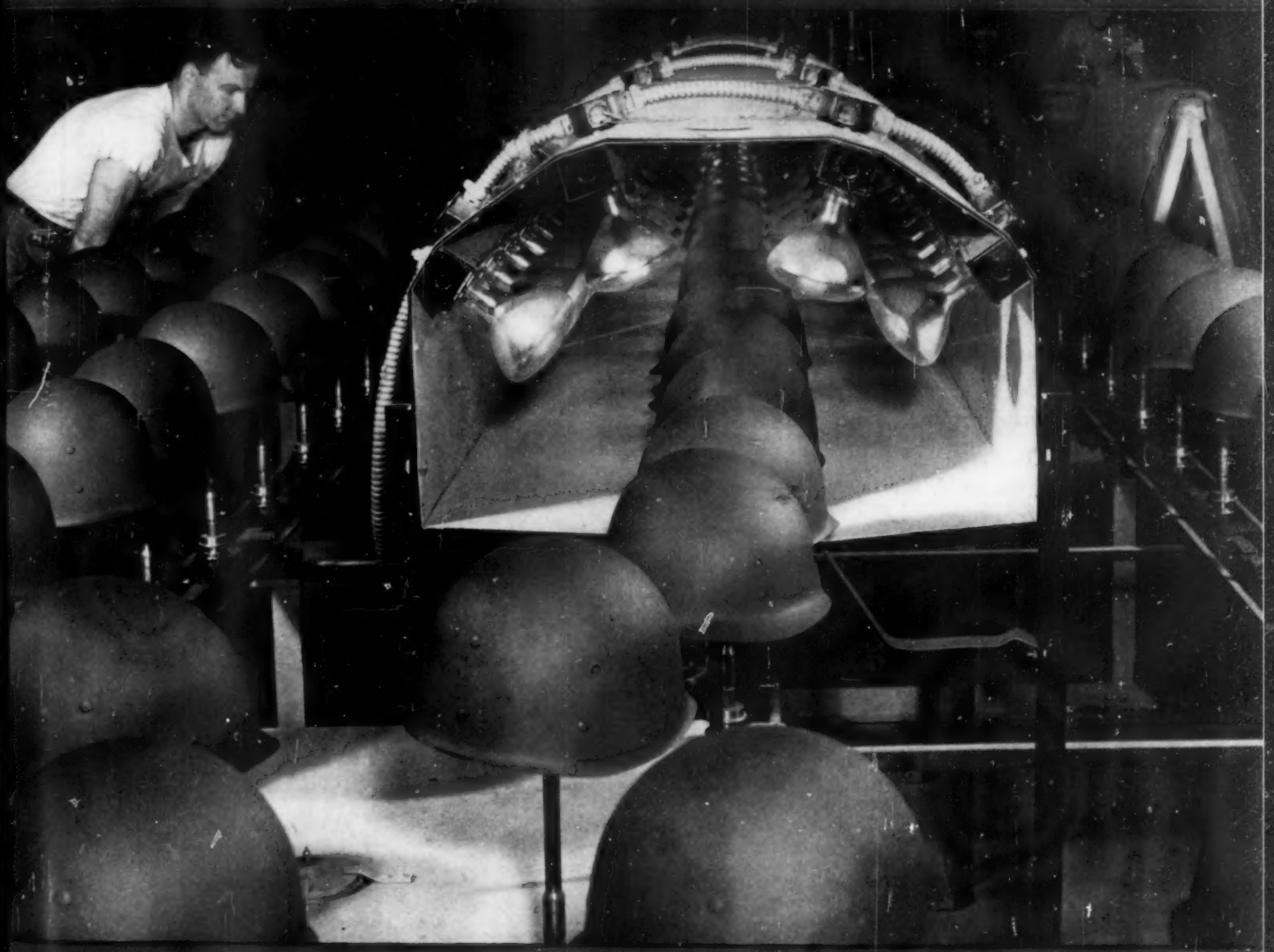
15 TECHNOLOGY DEPT. DETROIT

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • FEBRUARY 6, 1943



Modern Millinery

See Page 91

A SCIENCE SERVICE PUBLICATION

Do You Know?

Honey production in the United States is less than two pounds a person.

Ecuador is the second largest *tree rubber* producing country in Central and South America.

Mining copper in Chile, vanadium in Peru, and nickel in Cuba, are all being assisted with funds from the U. S. government.

Ceramic products, bricks, cements, porcelains, etc., are now exceeded in value only by iron and petroleum in annual production.

One hundred pounds of salvaged *kitchen fats* will make six pounds of glycerin which in turn will make 15 pounds of nitroglycerin.

Rubber and resin contents of plants may be determined by use of a five-minute micro-chemical test developed recently at Cornell University.

The biggest user of *borax* is the ceramics industry, particularly for glazes and enamels and for glass, with emphasis on heat-resistant glass.

Java is the most densely inhabited major area in the world, with a total population of over 49 million and over 800 persons per square mile.

Farmers raising short staple *cotton* are advised by the U. S. Department of Agriculture to switch to long-staple; or to soybeans, peanuts or feed crops, for which the war need is greater.

Question Box

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Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

Yellowstone National Park is cutting its herd of *elk* by 6,500 as it now has more than the safe carrying capacity of its ranges.

By *reinforcing* the tops and feet of rayon hosiery with combed cotton yarns, the durability can be increased between 100% and 200%.

Domestic *sumac* is a possible source of tannin for American tanners, to replace tannin formerly obtained from Sicilian sumac.

So many people have forgotten how to burn *wood* for household fuel that the Connecticut Forest Association has issued a bulletin on that subject.

SCIENCE NEWS LETTER

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MEDICINE

Virus May Cause Cancer

Powerful cancer-causing substance grows on chick embryos like other viruses, providing new evidence of primary cause of this disease.

➤ DISCOVERY of new evidence that the primary cause of cancer may be a virus is announced by Dr. Alfred Taylor, of the University of Texas (*Science*, Jan. 27).

He has developed a method of obtaining a powerful cancer-producing substance from cancer tissue. The substance seems to have all the characteristics of a virus. When injected into mice it produces tumors or cancers that start and grow more rapidly than transplanted cancers. Many scientists have long believed that cancers or tumors of man and other mammals, as well as a certain type of chicken tumor, might be caused by a virus or virus-like principle. But this is the first clear-cut evidence, apparently, that mammalian cancers have been produced by injection of material that does not contain cancer cells.

Yolk sacs of chick embryos, on which so many other disease-causing viruses grow, gave the clue to Dr. Taylor's discovery which may prove an important step toward solution of the cancer problem.

If the cause of cancer is a virus, it also should grow on chick embryo yolk sacs, he reasoned. So he implanted slices of mouse cancer tissue on the yolk sacs. These cancer tissues grew readily and after 12 days the yolk sacs were centrifuged and the fluid at the top was passed through a filter, like those used to filter other viruses.

This filtered fluid was injected under the skin of mice. Cancers rapidly grew at the sites of injection and smaller cancers were also found on internal organs.

By using eggs of fowl which have relatively long hatching periods, Dr. Taylor hopes that this method of attack may be applied to human cancers.

Even if such future experiments show that human cancer is caused primarily by a virus, it need cause no fear that cancer is contagious in the way that virus-caused diseases such as smallpox are. Dr. Taylor does not mention this point in his scientific report, but cancer authorities state that there is no evidence in the whole history of clinical and experimental investigation of cancer to show that it is spread in this way.

The term virus, broadly speaking, means anything that goes through a porcelain filter, is capable of causing changes in human or animal bodies, and is capable of multiplying. Viruses, however, differ widely from each other in size and other characteristics. Smallpox and infantile paralysis viruses invade the body from without. If cancer is caused by a virus, it is believed more likely to be one already existing in the body which becomes active under certain conditions.

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MEDICINE

Outcome of Severe Burns Influenced by Temperature

➤ RECOVERY from severe burns is decisively influenced by the surrounding temperature during the first 24 hours, Dr. Robert Elman, Dr. Warren M. Cox, Jr., Dr. Carl Lischer and Dr. Arthur J. Mueller, of Washington University Medical School and Barnes Hospital, St. Louis, and the Laboratories of Mead Johnson and Company at Evansville, Ind., have discovered.

The laboratory experiments with rats which led to this discovery, believed important in the case of war burns, are reported in the *Proceedings of the Society for Experimental Biology and Medicine*. (December)

The most favorable environmental temperature for recovery from severe burns is about 75 degrees Fahrenheit. At this temperature the lowest mortality (32%) occurred among the rats in the experiments. All burned animals in rooms at 32 degrees and 99 degrees Fahrenheit died within 24 hours after receiving burns.

With respect to application of the findings to treatment of human burn patients, the doctors point out that the commonly used heat tent which increases the temperature around the patient above 75 degrees Fahrenheit will be harmful by increasing the mortality in severe burns. For burn patients in the tropics, which would include many in the armed forces, the findings suggest, the doctors state, that it is important to lower the temperature of the patient's room.

First hint that the temperature surrounding the patient for the first 24 hours after being burned influences recovery came from studies of dogs with severe burns. An increased mortality among the canine patients was noticed when the temperature rose to 95 degrees Fahrenheit. This observation led to the experiments with rats.

Science News Letter, February 6, 1943

INVENTION

Air-Cooled Gloves Protect War Workers

➤ AIR-COOLED gloves now protect the hands of workers and improve the manufacture of landing lights for airdromes.

It all came about when the head nurse at the Westinghouse Lamp Division went to the beauty parlor. If an air blower could be used to cool her head while getting a permanent, she reasoned, why not air cool the gloves used by workers who handle hot glass lamps?

Now a low-pressure air hose extends into the gauntlet of each asbestos glove. This air-conditioning banishes the possibility of burns and workmen can handle the hot lamps with greater speed.

Added protection of workers also permits use of higher temperatures in the preheating process. This reduces glass breakage due to "shrinkage" and assures a good seal.

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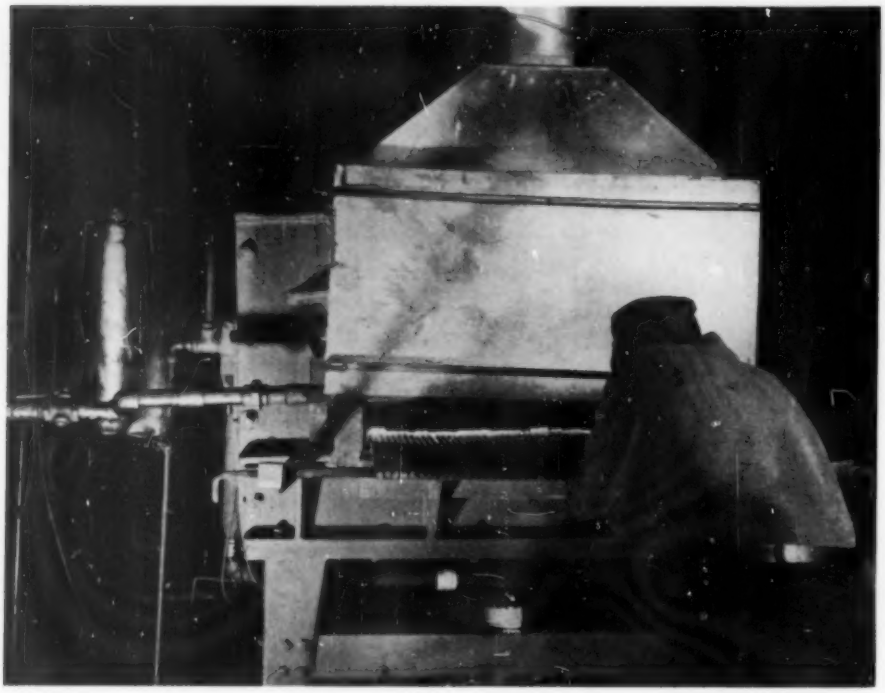
***SAFE**—This young lady in a war plant can take the hot glass landing lamp from the preheating temperature to the sealing temperature without burning her hands. The gloves are air-cooled.*



BURNING FLUID COAL—This forge furnace photographed at Battelle Memorial Institute is fired by fluid coal fed to the burners through the pipe at the left in the same manner as oil or gas.

ENGINEERING

Fluid Coal in Industry

Pulverized and mixed with air, coal can be made to flow through standard pipes and is suitable for many forging furnaces. May relieve fuel shortages.

➤ "FLUID" COAL, a pulverized form of coal which, when mixed with air, can be made to flow through standard pipes a quarter of a mile long, is being studied by fuel engineers at Battelle Memorial Institute, as a possible substitute for fuel oil in industrial heating processes.

Preliminary work on the application of this finely ground coal to industrial furnaces—which application if widely adopted may have great effect in alleviating shortages of fuel oil—has demonstrated that the fuel is entirely suitable for use in many types and sizes of forging furnaces, that it has advantages of fluidity similar to those of oil and gas, and that it gives flames of high emissivity which provide maximum heat transfer by radiation.

Of particular importance is the fact that for most sections of the country this material would be more economical for applicable industrial processes than the fuels now being used.

Investigations in the uses of pulverized coal have been in progress at the Columbus industrial research laboratory for several years and are now being intensified under an enlarged research program supported by the bituminous coal industry. Emphasis is being placed upon the application of the finely pulverized coal to forging, heat-treating, and other metallurgical furnaces, which now consume great quantities of oil and gas in the war industries.

"Fluid" coal is produced by grinding coal to dustlike fineness in specially designed mills. A stream of air entering the mill picks up the fine particles and delivers them to collectors. The material when not impacted will flow through your fingers and pour somewhat in the manner of a liquid. When mixed with air it demonstrates fluid-like properties, will flow through pipes, and spray out of jets.

That the substitution of pulverized coal for oil and gas in some metallurgical processes is entirely practical is verified by the fact that a number of plants have been using pulverized coal for steel-heating furnaces for many years. In fact, in 1920—in the days before oil and gas became cheap—there were 690 known pulverized coal furnaces in operation in this country. The development retrogressed, however, with the discovery of vast new sources of oil and gas and the sharp reductions in the costs of these fuels.

Investigations by Battelle scientists have indicated that there is great possibility of extending the use of pulverized coal to hitherto unexplored fields. It has been tried in the radiant-tube furnace, which is used in heat-treating, annealing, and enameling, with promising results. The successful application of pulverized coal to this type of furnace would remove the principal disadvantage of coal in refined metallurgical work, namely, the fly ash, cinder, and sulphur, since combustion takes place inside alloy-steel tubes lining the walls of the furnace.

Finely pulverized coal ignited in air burns rapidly, releasing great quantities of energy. A part of the Battelle investigation of this fuel, but one having less immediate application in industry, is the study of a direct means to harness this energy.

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METALLURGY

Mirrors Used to Measure Width of Steel Slabs

➤ NOT ALL mirrors are in beauty parlors. Some are in steel rolling mills. There they do not reflect the rosy face of a lady, but the face of a yellow-hot slab of steel as it comes from the rollers.

These slabs must be of uniform width within a half inch or so. They are not in a position to be easily measured with a gauge. Sometimes they are as much as 13 feet in width.

A scale is used mounted in any convenient place, with white lines on a black background. One set of mirrors is arranged to catch an image of the glowing steel and a second set is aimed at the scale. A third mirror superimposes one image on the other. By watching it the operator has a constant check to be sure he is getting a slab of the proper width.

Science News Letter, February 6, 1943

CHEMISTRY

Soybean Rubber Produced

Norepol, synthesized from soya, corn and other vegetable oils by Department of Agriculture chemists, now going into commercial production.

➤ NOREPOL, the rubber-like material synthesized from soybean, corn and other vegetable oils by U. S. Department of Agriculture chemists at the Northern Regional Laboratory in Peoria, Ill., is now going into commercial production. Two companies are making it under trade names of their own, while others are producing it under the coined name given it by the Department.

Norepol is a combination-word formed from the first syllables of NOrthern REgional POLymer. Technically it is a polymer of lineoleic acid, one of the fatty-acid fractions of many vegetable oils. A polymer is a compound with big molecules, formed by welding together smaller molecules of other compounds. As a rule, polymers are "thicker," more solid, and harder or more elastic than the substances from which they are made.

Norepol, although rubber-like in its properties, is not a full substitute for rubber. It will stretch to only twice its normal length, instead of six times as in real rubber. Its tensile strength is only 500 pounds per square inch, as compared with 3,000 pounds or more. Nevertheless, it has good resistance to abrasion and aging and is impervious to water and alcohol, so that it can replace rubber in such uses as shoe heels, fruit jar rings, gaskets and tubing. Demand for norepol is estimated at 12,000 tons or more for the current year.

Since only the fatty acid from the oils is used in its manufacture, the other half of the oil compound, glycerin, is released as a co-product for the manufacture of explosives and other technical purposes.

Natural rubber from two other sources fostered by the Department of Agriculture is beginning to come in. More than 18,000 pounds of kok-saghyz roots have been harvested from the first experimental plantings, made possible by large shipments of seeds of this rubber dandelion rushed to this country from the beleaguered Soviet Union last spring, even while the Nazi armies were storming to new conquests.

This harvest represents only a small fraction of the plants grown in many plantings over a large part of the country, to test the adaptability of the plants to American soils and climatic conditions. The greater part of the first year's crop has been left in the ground, to test the plants' over-wintering abilities in this country. In the meantime, labor-saving machinery has been worked out to harvest the first American-grown crop of seed.

It is emphasized that all the work thus far is experimental. No appreciable amount of dandelion rubber will be harvested in the immediate future, nor will any seed be available to farmers who may be thinking of growing the plant themselves.

The native American rubber shrub, guayule, is making a small beginning, on lands taken over from the Intercontinental Rubber Company by the Department of Agriculture. A mill operated by the U. S. Forest Service at Salinas, Calif., will turn out 600 tons of guayule rubber this winter, using older shrubs that were already growing before Pearl Harbor.

Plantations being established this winter are expected to yield about 21,000 tons from the harvest starting late in 1944. Further extensions will put the figure up to a maximum of about 80,000 tons. Although this is not much more than a tenth of the annual rubber requirement in this country, it will help.

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PSYCHIATRY

Youngest Drafted Men Are Most Healthy Mentally

➤ EIGHTEEN- AND NINETEEN-YEAR-OLD men called up by the draft are a more healthy group, mentally, than are older men, it is revealed in a report by Dr. Ernest E. Hadley, psychiatrist who serves on the Army Induction Board near Washington, D. C. (*Psychiatry*, November).

The rate of rejection for mental disability is only 48.78 per thousand for the 18-19 age group. The average for all ages is 329.6 per thousand. And the highest rate, for the 44-45 year group, is 635.13. These figures are based on a study of 2500 men who appeared consecutively before the psychiatrists on Army induction boards.

Most common reason for rejection on psychiatric grounds is for the mental disease schizophrenia and related conditions, including a state recognized as preceding the frank occurrence of this mental illness. The average rate is 116 per thousand.

Greatest number of rejections for this reason is in the 44-45 year group, of whom 206.34 per thousand are judged unfit for military service. Next comes the 34-35 year group with 165.04 per thousand. Next is the 28-29 group with 154.16 per thousand. Men between 36 and 40 have a rate slightly below average, as do also men 24-25. The 22-23 group and the 40-41 group have a somewhat lower rate—89.70 and 85.71.

In the 18-19 group only 24.39 per thousand must be rejected for this cause. In the 20-21 group, the rate is 64.28 per thousand.

Next to the schizophrenic group, the neurotic disorders are to blame for the highest psychiatric rejection rates. But in this group, too, rejections are low among the youngest men. The rate for the 18-19 group is only 24.39 per thousand and for the 20-21 group only 75.00 per thousand, as compared with the average of 106 per thousand.

There is no type of mental disability for which the rejection rate is higher among the youngest men.

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NUTRITION

Dutch Using Tulip Bulbs As Coffee Substitute

➤ COFFEE may be scarce and hard to come by in this country; but you haven't started digging up your flower-beds yet to fill the percolator. That's what the Dutch are doing—grinding up roasted tulip bulbs to make a coffee substitute, the Netherlands Information Bureau states. The hard-pressed Hollanders are also mixing powdered bulbs with their flour, to stretch their bread supply.

There is a Nazi "Verbot" against the "abnormal use" of tulip bulbs and crocus corms, because of their export value. But their unwilling subjects in the Netherlands pay no more attention to that than they do to a lot of other orders.

Prices of real coffee in the Dutch black market are simply fantastic, according to underground information sources. One small package, of a little over four pounds, recently sold at the rate of $31 a pound.

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MEDICINE

Poison Protection

Patients being treated with big doses of certain arsenic drugs may eventually be protected against ill effects by chemical.

➤ PATIENTS treated with big doses of certain arsenic drugs may eventually be protected against poisonous effects which sometimes occur. This discovery is announced by Dr. J. H. Sandground of the Lilly Research Laboratories (*Science*, Jan. 15).

Dr. Sandground was testing an arsenical drug, carbarsone, for its action on trypanosomes, the tiny disease-causing parasites. Results looked good. Then he wondered whether the action would be blocked by para-aminobenzoic acid—sometimes dubbed "pab"—just as the sulfas are robbed of their curative power by the same chemical.

Rats given big doses of carbarsone in combination with "pab" soon showed signs of recovery. Fever and anemia lessened, showing that the disease-causing trypanosomes were being blitzed just as fast as usual. A big majority of the rats survived. But most of the rats died that received the same big doses of carbarsone without any "pab."

In some way, Dr. Sandground decided, the "pab" protects rats against excessive doses of carbarsone.

Perhaps it would also protect against possible poisoning from administration of other arsenic compounds of the same type. So he tried it on tryparsamide: then on atoxyl and acetarsone which are relatively more unsafe.

Killing doses of the drugs were given to rats in various ways—in stomach, vein and muscle—still "pab" pulled a large proportion of them through (70 to 100%). Of those that didn't receive "pab," few survived—18% on the average.

Research work is now continuing to find out more about this protective action against undesirable arsenic effects which sometimes occur in treatment of amebic illness, such as dysentery, and trypanosome diseases like sleeping sickness.

Additional studies of clinical applications in man are also being made, Dr. Sandground reports, especially in connection with the arsenical treatment of syphilis attacking the central nervous system.

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VICTORY SYRINGE—This new one-dose morphine syringe was developed for OCD. It is made entirely of glass and plastic, saving war-needed tin.

MEDICINE

New Morphine Syringe Developed for OCD

➤ A NEW MORPHINE syringe to ease pain and fight shock in home-front casualties has been developed for the exclusive use of physicians attached to the OCD Emergency Medical Service.

Because of the critical shortage of tin, the new device is made entirely of glass and plastic. The single-dose syringe generally used for this purpose has been made almost entirely of tin, consisting of a small tube similar to that used for toothpaste, from which the physician squeezes the drug solution through a needle attached to the opening.

The new device to be used by OCD is a small glass ampule with a thin, tapering neck over which is fitted a soft plastic tube. The needle is attached to the end of the tube.

The drug solution is sealed in the glass ampule under pressure of about 15 pounds per sqare inch. To administer the medicine the physician inserts the needle into some part of the patient's body and breaks the thin neck of the ampule by bending the plastic tube. The pressure inside the ampule forces the solution out through the needle.

Administration of morphine to persons trapped under bombing debris or in the collapse of a building has been found by the British to be a highly desirable first step in rescue. Such treatment greatly increases the victim's chances of recovery by easing pain, inducing rest, and retarding the development of hysteria and shock.

An additional asset of the new device is that it can be used with one hand so that a victim trapped inside a structure or buried beneath debris can be aided if the physician is able to reach any part of his body.

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MEDICINE

Tropical Climate Makes People Prone to Allergies

➤ TROPICAL heat makes people and other animals more prone to allergic trouble, such as hay fever and hives, but allergic troubles are much commoner in temperate zone lands, Dr. Clarence A. Mills, of the University of Cincinnati, told the Fifth Annual Forum on Allergy in Cleveland.

The seeming contradiction is explained by the fact tropical rains keep the atmosphere washed clear of plant pollens. In only a few tropical areas is there cyclonic storminess to give wide pollen distribution through the upper atmosphere.

In most temperate regions, however, troublesome pollens are more commonly produced and are given much wider distribution through the upper air currents of our cyclonic storms.

The storms also bring us a large number of colds and other nose and throat infections, Dr. Mills pointed out, and thus increase our troubles with bacterial allergy. There is also a hint, he said, that falling barometric pressures as storms approach tend to cause tissue swelling and greater sensitivity to allergic reactions.

People in the tropics may suffer less from hay fever because of the rain-washed, pollen-free air, but their greater tendency to allergic reaction shows itself in another way. Reactions to foreign proteins encountered in the course of medical treatment for disease, Dr. Mills said, are more frequent and more troublesome in residents of warm countries than in those of middle temperate coolness.

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● RADIO

Saturday, February 13, 1:30 p.m., EWT

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Some of the winners of the second Science Talent Search will discuss "Science's Next Great Step Ahead."

Monday, February 8, 9:15 a.m., EWT; 2:30 p.m., CWT; 9:30 a.m., MWT; and 1:30 p.m., PWT

Science at Work, School of the Air of the Americas over the Columbia Broadcasting System, presented in cooperation with the National Education Association, Science Service and Science Clubs of America.

"Man Against Insects" will be the subject of the program.

ENGINEERING

Engineers Can Carry Substitutions Much Further

➤ MORE SUBSTITUTE materials can be developed by American engineering as needed for the war effort, John G. Wood, assistant chief engineer, Chevrolet Division of General Motors Corporation, declared at the War Engineering Production meeting of the Society of Automotive Engineers in Detroit.

The extent of substitution to which we must go cannot be foretold. But even if Army vehicles had to be made of cast iron, the speaker maintained that vehicles would be produced to do the job required of them.

On one type of Army truck at present, 107 rubber parts have been replaced by less critical materials such as plastics, cotton, iron and paper, or have been eliminated altogether. Substitutes ranging through lead and cadmium plate to cactus fiber replace 129 copper alloy items. On this same truck, 60 parts of nickel and chromium alloy have been substituted for by steels with less critical elements.

Shorter life of parts must be accepted as the result of some substitutions, Mr. Wood warned. But it has been the policy throughout the automotive industry not to sacrifice durability where safety of our men is involved.

Thorough testing has often produced a substitute just as satisfactory as the original. Present production often cannot wait for extensive field tests. Then special apparatus is set up in the laboratory, Mr. Wood explained. Normal loads are applied and released at a much higher rate of speed than would normally occur in service. Thus in a short time engineers discover weaknesses that would show up only after months of use.

PSYCHOLOGY

Science Talent Test

Over 14,000 copies of science aptitude examination were distributed to teachers for testing their most talented students. Best selected for Talent Search.

By WATSON DAVIS

Director, Science Service.

➤ WHAT IS YOUR ABILITY in science? To answer this question for boys and girls just finishing high school, over 14,000 copies of a science aptitude examination were distributed previous to December 28 so that teachers could give them to their most talented students.

The tests of the second annual Science Talent Search offered to your high school and others throughout the nation have just been completed, so now anyone can try the examination on his own brain.

The test, reproduced in part on this page, is only one step in the selection of boys and girls who are scientifically gifted. In addition each contestant filled out a personal data blank and wrote an essay on what he believes will be the next great step in science. Teachers filled out a recommendation form and principals reported scholarship. All these requisites are used in choosing winners.

Forty contestants will receive free trips to the Science Talent Institute to be held in Washington, D. C., in February. Of these, two will be selected to receive $2,400 Westinghouse grand scholarships to the college of their choice, eight will get $400 Westinghouse science scholarships, and additional Westinghouse scholarships totaling $3,000 will be awarded at the discretion of the board of judges. Honorable mentions also will be awarded to call the attention of colleges and universities to those contestants of outstanding ability.

Leadership Speeded

This will uncover scientific ability among those ready to enter college. Thus, exceptional youths, in the shortest possible time, will take up leadership in scientific research so important to the war effort and be ready to take a hand in the scientific world of the peace to come.

Science Service, sponsoring Science Clubs of America, is conducting the Science Talent Search as a part of the science club movement.

The aptitude examination does not test what a person already knows about science. It is designed to tell how well you can reason and understand. Thus, even those who have no special training in science will want to try it.

The test was devised for the Science Talent Search by Dr. Harold A. Edgerton, director of the Occupational Opportunities Service of Ohio State University and Dr. Steuart Henderson Britt, executive director of the National Research Council's Office of Psychological Personnel. The most advanced testing methods developed over the past two decades, were utilized in constructing the test.

Of the thousands of boys and girls who took the examination last year, not one made a perfect score. When you try this selection of questions from the examination you should, therefore, not expect to find that you have checked all the right answers.

To save your time only typical questions out of the original three-hour examination are reproduced on this page. You should be able to do the 18 questions, aside from the first five warming-up questions, in about a half hour.

Excel in Scholarship

Those who make high scores on the science aptitude test, in general, also excel in scholarship. This is shown by last year's 300 highest-ranking contestants, 99% of whom were in the upper 5% of their high school classes. Many are now making outstanding records in colleges throughout the country.

The life and achievements of each of the 3,200 students who completed the 1942 competition will be closely followed for the next ten years by Dr. Edgerton and Dr. Britt, who are vocational psychologists. Results of the study will be of interest to every educator in the country.

Only experience of the passing years will show to what extent those selected in the Science Talent Search will produce real contributions to science and engineering that will make the world a better place in which to live.

(*Turn to next page*)

DIRECTIONS: This is a test to see how well you can read and understand the materials of science. You will be allowed three hours for this test. Most students will be able to finish in less than two and one-half hours. The entire test must be completed during one test session. Read each paragraph and then answer each of the questions asked, by putting an X in the answer box corresponding to the number of the answer which is *most nearly correct*. For each question there is *one best answer*. Do not spend too much time on any one question. You may return to it later. In case you wish to change an answer, erase completely, and then mark the correct answer. Any question with more than one answer X'ed will be counted wrong. In order to make sure that you understand the directions, answer the questions below which refer to this paragraph. The correct answers are indicated for the first two questions. Then mark the correct answers for questions 3, 4, and 5.

ANSWERS

1. The time allowed for this test is *1:* one hour *2:* two hours *3:* two and one-half hours *4:* three hours — ☐ ☐ ☐ ☒ (1 2 3 4) — 1
2. How many students can expect to complete the test within two and one-half hours? *1:* most *2:* half *3:* a few *4:* none — ☒ ☐ ☐ ☐ (1 2 3 4) — 2
3. The right way to indicate your answer to a question is to *1:* mark out the answer *2:* make an X in the appropriate answer box *3:* write the answer in the margin *4:* mark out all wrong answers — ☐ ☐ ☐ ☐ (1 2 3 4) — 3
4. Among the answers for each question there is always: *1:* one best answer *2:* one right and three wrong answers *3:* two answers which are correct *4:* no completely correct answers — ☐ ☐ ☐ ☐ (1 2 3 4) — 4
5. This test is designed to measure *1:* your ability to guess *2:* your knowledge of science subject matter *3:* your ability to understand scientific subject matter *4:* your reading speed — ☐ ☐ ☐ ☐ (1 2 3 4) — 5

Do NOT turn over the page until you are told to do so.

I am beginning the Science Aptitude Examination at_____o'clock.

PARAGRAPH NUMBER 2: About 3,000 stars are visible with the naked eye at any time under the most favorable conditions. To a first approximation the stars appear to be fixed relative to one another on a celestial sphere which makes one revolution around the pole star in 23 hours, 56 minutes, and 3 seconds. On the sphere appear also the sun, moon, and planets. These continually change their positions with respect to the stars. The moon moves eastward on the celestial sphere about 12° per day, the sun moves eastward about 1° per day, and the planets move mostly eastward but sometimes westward at varying rates. Except for the sun and moon most objects in the sky fall within a range in brightness of approximately 500 to 1. The average of the 20 brightest stars is only 100 times as bright as the faintest star that can be seen by the naked eye. Some stars are blue white, others white, some yellow, some orange and some red. The planets other than Mars are yellow, and their light resembles that of the sun.

QUESTIONS ON PARAGRAPH 2: ANSWERS

5. A clock which keeps star time would have to *1:* run more slowly than our ordinary clocks *2:* run at the same rate as our ordinary clocks *3:* run faster than our ordinary clocks *4:* have a different type of construction than our ordinary clocks — ☐ ☐ ☐ ☐ (1 2 3 4) — 5
6. For the sun to return to the same position in the celestial sphere (relative to an observer on the earth), it will take *1:* more than one clock year *2:* less than one clock year *3:* slightly more than one clock day *4:* one clock day — ☐ ☐ ☐ ☐ (1 2 3 4) — 6
7. The celestial sphere is *1:* the locus of the earth's rotation *2:* the periphery of the solar system *3:* a synthetic concept *4:* the locus described by the major constellations — ☐ ☐ ☐ ☐ (1 2 3 4) — 7
8. To an observer on the earth, the celestial body which retains its absolute position is *1:* the sun *2:* the moon *3:* Mars *4:* the pole star — ☐ ☐ ☐ ☐ (1 2 3 4) — 8
9. To an observer on the earth, the celestial body showing the greatest relative change of position is *1:* the sun *2:* the moon *3:* Mars *4:* Polaris — ☐ ☐ ☐ ☐ (1 2 3 4) — 9
10. The brightness of the sun is to the brightness of the faintest visible star as *1:* 500 to 1 *2:* 100 to 20 *3:* 1 to 20 *4:* indeterminate — ☐ ☐ ☐ ☐ (1 2 3 4) — 10

TALENT SEARCH TEST—You can test yourself and see how you compare with the talented high school seniors who are coming to Washington for the Science Talent Institute. Answer the questions. Then look on page 89 for the answers and the meaning of your score.

APH NUMBER 9: The vertebrate integument consists of the skin and its derivatives. The exterior surface of the body ly cov d by the skin except in the areas of the nose, mouth, anus, and genital openings where it passes into a ue, th ucous membrane, which lines passage-ways. The skin may be divided morphologically into two layers — his, d rd from the primitive ectoderm, and the corium which arises from the somatic mesoderm. The epidermis is of ma layers of cells in two principal strata, the stratum corneum, and the stratum germinativum. The flattened cells surfa e are hardened by deposits of paraleidin, a substance related to keratin, and are said to be keratinized. Below everal ers of thicker cells whose active proliferation gives rise to the cells of the stratum corneum. These layers lie strata germinativum, or malpighian or pigment layer. Granules of keratohyalin appear in the outer cells of this foreru ers of the paraleidin, forming the thin stratum granulosum. A thin clear zone just outside of the granular rn as a stratum lucidum, is regarded as the basal layer of the stratum corneum. In its cells the granules of kerato- me a fuse intermediate substance, eleidin. The exchange of food and waste between the malpighian layer and the ected osmosis and diffusion since no capillaries rise above the corium. The corium is a dense connective tissue layer from a fatty subcutaneous tissue. It is obscurely divided into an inner stratum reticulare and an outer stratum papil- arisen papillae beneath the epidermis. The papillae are either nutritive or sensory. Epidermal derivatives including es, sw glands, and sebaceous glands extend into the corium; and it contains nerve endings, tactile corpuscles, and ls

NS G PARAGRAPH 9:

ANSWERS

e skin pricked with a pin so that blood is drawn, we know that the pin has penetrated at to the stratum corneum *2:* pigmented layer *3:* stratum germinativum *4:* stratum lare — 47

nung the several layers of the integument beginning with the surface, the skin pigment is in num *1:* II *2:* III *3:* IV *4:* V — 48

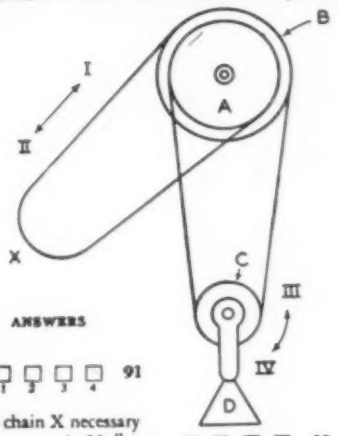
layer which originally gives rise to the keratinized material is the *1:* stratum reticulare atum ainosum *3:* stratum corneum *4:* stratum granulosum — 49

mesodermal structures present in the corium are *1:* blood vessels *2:* sebaceous glands tritis papillae *4:* eleidin — 50

stratum granulosum *1:* lies above the stratum malpighii *2:* lies below the stratum reticulare adjac to the stratum corneum *4:* contains eleidin — 51

nucl found in the stratum germinativum is *1:* stratum corneum *2:* stratum papillare atum ticulare *4:* stratum malpighii — 52

ous membrane is *1:* keratinized *2:* adjacent to the stratum corneum *3:* derived from ctoder *4:* derived from the mesoderm — 53



PH NUMBER 16: The diagram represents a pulley system. nd are fixed so that they can only rotate together. A has a ce of inches, and B has a circumference of 20 inches. as a inch circumference. The chain X is an endless chain.

NS G PARAGRAPH 16:

ANSWERS

n chain X is pulled in direction I, the direction and rotation of movable y C will be *1:* up, III *2:* down, III *3:* up, IV *4:* down, IV — 91

equir pounds pull to operate the hoist without weight D, the force applied to chain X necessary t a weight D of 80 pounds will be *1:* 3 lbs. *2:* 3½ lbs. *3:* 4 lbs. *4:* 20 lbs. — 92

aising load D through 2 inches, the number of revolutions made by pulley C will be 19/00 *2:* 2 *3:* 8 *4:* 16 — 93

e bo of the chain loop around X and the pulleys is 100 inches from the center of the ys, length when C has revolved twice and D has moved down will be *1:* 80.0 inches 9.5 *3:* 105.0 inches *4:* 120.0 inches — 94

mechanical advantage of this chain hoist, disregarding friction, is *1:* 20:1 *2:* 19:1 :19 *4:* 40:1 — 95

Don't read further. Cover up this paragraph until you have taken the test. Here are the correct answers: 5, **3**; 6, **2**; 7, **3**; 8, **4**; 9, **2**; 10, **4**; 47, **4**; 48, **3**; 49, **4**; 50, **2**; 51, **1**; 52, **4**; 53, **2**; 91, **4**; 92, **3**; 93, **3**; 94, **2**; 95, **4**.

The following rating estimates how your score would compare with the brilliant group of high school seniors who completed the examination. The rating is based on your probable score for the entire examination computed from the portions which you have already taken.

If more than ten were scored right you did better than three-fourths of the scholars.

Those who got six to nine correct did well, falling in the middle 50%.

Five or less answered correctly, puts you in the lower fourth of those who completed the competition in the annual Science Talent Search.

Science News Letter, February 6, 1943

PSYCHIATRY

More Mental Health Units In Army Camps Urged

➤ MANY MEN could be saved for effective service in the armed forces and many mental breakdowns during training, costly to the man and the nation, could be prevented by the establishment of more mental health units in Army camps, Dr. George S. Stevenson, medical director of the National Committee for Mental Hygiene, declared.

Commending the efforts so far made in this direction, Dr. Stevenson spoke of Mrs. Eleanor Roosevelt's recent visit to the mental health unit at Ft. Monmouth, N. J., and her endorsement of its accomplishments. He said he heartily agreed with her "that such units should be installed in every classification center in the country."

Men who would be particularly susceptible to mental breakdown should be excluded before induction, so far as possible, Dr. Stevenson stated. In the haste of induction examinations, however, such men sometimes are passed, to the detriment and even potential danger of themselves and their units.

When danger signals show up after induction, a mental-health unit can provide means for their appraisal and treatment. Three-quarters of the men seen at such a unit are essentially normal, though giving evidence of minor maladjustments which might become serious if they remained untreated.

"Many danger signals come to the

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attention of chaplains, company officers, instructors, military police, Red Cross and U.S.O. workers, and other special personnel," Dr. Stevenson said. "Heretofore, there has been little that could be done about the man who sits disconsolately in the U.S.O. hut, taking no advantage of its reading or recreational facilities; or about the man who in spite of exceptional intelligence cannot absorb the training; or the man who drowns his troubles in liquor, or goes A.W.O.L.

"These troubled individuals can now be given help in a mental health unit, if one exists in his camp, and it is significant to note that nearly one-quarter of all the men seen have sought such guidance spontaneously."

Science News Letter, February 6, 1943

RADIO

Radio Is at War

More than 500 factories and small shops are turning out equipment for the armed services. New specifications call for perfect performance.

➤ MORE THAN 500 factories and small shops, that used to make radio sets and equipment for civilian use, now have some 200,000 employes working day and night turning out communications equipment for the armed forces of America and her fighting allies, Rear Admiral Stanford C. Hooper, U.S.N., told the meeting of the Institute of Radio Engineers.

As a single dramatic example of what quick radio communication means in modern warfare, Admiral Hooper related an incident of the fighting during landing operations at Casablanca. The most formidable French warship putting up resistance was the battleship Jean Bart. An Allied battleship opened fire on her, at a range of 26 miles.

The first salvo scored a hit on her deck, a damaging but not a fatal blow. An observation plane flashed back a slight correction. The next salvo struck the ship at the waterline, immediately putting her out of action.

For military uses, radios must have qualities far beyond the very moderate requirements of peacetime sets, the Admiral reminded his hearers. He said:

"These new specifications reflect the demand for perfect performance; perfect reception by planes flying at twenty thousand feet, battling ice and sleet, as well as the enemy; perfect reception by pitching tanks, hurdling debris and jolting through shell holes in the heat of the African deserts; perfect reception for all our mobile equipment, whether it be in the Battle of Midway, the Aleutians, or the green hell of steaming jungles in the Solomons.

"These specifications call for equipment that must stand up with full efficiency under all conditions—tropical and Arctic temperatures, rapid changes in altitude, varying humidities, salt spray, hot sun and desert sands. It must be unaffected by the motion of motorized units, ships and aircraft, and the jar and vibration due to gunfire and shell impact. It must be fireproof, especially from the instantaneous hot flame which follows a bomb explosion or proximity to hot metal surfaces. It must carry on during severe icing and snow conditions. It must be rugged to withstand mishandling and operation by inexperienced personnel, and jars due to handling in transit. It must be designed to compromise ruggedness and extreme sensitivity.

"It must be capable of being operated adjacent to various other transmitters and receivers through the roar of battle, through electrical and other noises of ships and planes, and radio jamming. The radiation from tubes must not divulge presence to an enemy. It must be flexible in frequency shifting and power variation in order that shifts from one command or information channel to any other may be accomplished as required, and instantaneously.

"It must be constructed for installation in most limited spaces, with minimum weights, and convenient for operation. It must be instantaneously ready for operation at all times, exactly on the prescribed frequency, and accessible for adjustment and quick repair. Danger of accident due to electric shock to personnel must be prevented. These are but a few examples to show the need of specifications more elaborate than those governing design of commercial equipment."

Science News Letter, February 6, 1943

ASTRONOMY

Victory Ship Named for Designer of Telescopes

➤ A NOTED American astronomer, designer of the 100-inch telescope at the Mt. Wilson observatory and projector of the huge 200-inch reflector now being built for the new observatory on Mt. Palomar, was commemorated in the launching of the Victory ship George E. Hale, just off the ways of the California Shipbuilding Corporation. Dr. Hale's widow, Mrs. George E. Hale of Pasadena, was sponsor of the new vessel.

Dr. Hale died at Pasadena in 1938, at the age of 70 years. Besides planning the most massive instruments ever built for the exploration of the heavens, he carried on researches in solar physics and stellar evolution, and was the inventor of the spectroheliograph, which makes photographs of the sun in the light of a single selected element. He shares the latter honor with a French astronomer, Deslandres.

Science News Letter, February 6, 1943

SAVING—The layouts shown here show how precious metal is being saved in cutting pieces for war production. At the left is the way the patterns have been laid down when metal was more plentiful. At the right are economy layouts worked out by a General Electric Company expert.

PLANNING—Working out a war-essential sort of jig-saw puzzle, J. C. Smith, General Electric Company planner, arranges a layout with paper pieces to insure minimum waste when the patterns are later cut from steel.

ENGINEERING

Power From Tests

More than half the power needed to operate an engine factory can be obtained from energy formerly wasted by plane engines on test block.

➤ MORE THAN half the power needed to operate an engine factory can be recovered from tests of plane engines, G. E. Cassidy, W. A. Mosteller and W. L. Wright of the General Electric Company reported to the American Institute of Electrical Engineers meeting in New York.

The power-recovery method has helped the war effort by giving to the aircraft engine industry a testing technique that contains advantages not available in other methods, the engineers pointed out. Testing can be made with greater ease and in less time on a basis that is economically sound.

Previous to the development of the new power-recovery system, energy produced during testing was dissipated by water brakes, propellers, electric brakes and other devices which involved complete wastage. Fuel consumed accomplished no useful purpose other than testing of the engine. Furthermore, engines became so huge that schemes to dispose of the power by wastage began to present difficult problems.

Starting with an inquiry for an improved method from Pratt and Whitney Aircraft, development of the power recovery system has gone through several phases.

Using an induction generator, one of the latest setups begins the test with a cold start and run-in test for checking mechanical operation and lubrication of the engine. Then speed is gradually increased. When ready to "fire" the ignition switch is turned on and the engine throttle adjusted to idling speed. As the throttle is opened, the generator speed passes through synchronism and load is automatically applied to the engine. Any desired values of load and speed can be established.

From such a test, the engineers reported that 3,000 to 6,000 kilowatt-hours of energy may be recovered from each engine of current-large rating.

"The advantages of the power-recovery system applied to the testing of aircraft engines have not yet had time to be universally appreciated," the engineers maintained.

"It may be quite possible that with the passing of time the engine builder will point with more and more favor (toward wider use of the method) because he is already pointing toward larger aircraft engines—and the larger the engine the more advantageous power-recovery testing becomes."

Science News Letter, February 6, 1943

PUBLIC HEALTH

Meningitis Increases Almost 20% in Week

➤ CASES OF meningitis throughout the nation increased almost 20% during the week ending Jan. 23, latest for which figures are available. Reports from state health officers to the U. S. Public Health Service show 354 cases for the past week as compared with 298 for the week of Jan. 16. Most of the cases are on the East and West coasts.

Total number of cases for the year to date, that is, to Jan. 23, is 941, which is probably the largest number for that short a period since the U. S. Public Health Service has been keeping weekly records of this disease.

Influenza cases totalled 4,387 for the week of Jan. 23, about the same as for the previous week. Measles increased slightly.

There were 23 cases of smallpox, five in Ohio and four in Indiana. No other state reported more than two.

Science News Letter, February 6, 1943

ENGINEERING

Infrared Lamps Dry Painted Plastic Helmets

See Front Cover

➤ PLASTIC helmet liners weighing only 12 ounces are said to be as strong as steel of the same weight. They give our soldiers adequate protection during non-combat duty and comfort under the steel helmets during battle.

The photograph on the front cover of this week's SCIENCE NEWS LETTER shows freshly painted hats of war going under the drying rays of infrared lamps in a Westinghouse Electric and Manufacturing Company plant.

Science News Letter, February 6, 1943

The *pecan*, America's most valuable native nut tree, yields over 60,000,000 pounds of nuts annually.

Aircraft used in desert country are fitted with a special *filter* to keep out as much of the sand as possible.

PSYCHOLOGY

Efficiency in Cockpit

Suggestions for re-design of airplanes to provide better hearing and seeing and less fatigue for pilots and crew may improve their fighting.

➤ CHANGES in plane designs to aid the hearing and vision of American combat fliers were recommended to the Institute of Aeronautical Sciences meeting in New York.

"Both seeing and hearing, if accompanied by prolonged attentive effort, especially under conditions of unfavorable plane design, are capable of contributing to pilot and air crew fatigue and loss of efficiency," declared Prof. Walter R. Miles, Yale University psychologist. Collaborators with Prof. Miles in preparing the report were Commander Leon D. Carson, head of the Medical Research Section in the Navy's Bureau of Aeronautics, and Prof. Stanley S. Stevens, one of the directors of the Psycho-Acoustic Laboratory at Harvard University.

Plane gunners should be moved much nearer the aiming window, the scientists suggested. The position of the gunner now gives him the same sort of vision as he would have in a tunnel, since his eyes are some distance away from the window.

Sections of gun mounting, electrical switches and other gadgets which lattice the aiming window are also a hazard to vision and life, the scientists warned. They believe it will be possible to reduce the amount of structure in front of gunners.

Clearing away these obstructions to vision and moving the gunner nearer the window will "increase his angle of uninterrupted view, make visual pursuit of his targets easier, and reduce the blinding effect from the flashes of his own guns," Prof. Miles explained.

In the cockpit, the instrument panels have too large an illuminated area. They are usually illuminated too intensely and with a color that disturbs night vision. Indirect red light was recommended by Prof. Miles and his associates as best.

Discussion of vision from the cockpit disclosed that transparent enclosures often become discolored with exposure to sunlight or become checked due to temperature changes and vibration.

"Rapid strides in development of better plastics are being made," he explained, "and it should be possible soon to mold transparent cockpit enclosures of better grades of optical plastics in one piece. Surface hardening of such molded parts is desirable."

The ears of flying personnel take even greater abuse than their eyes, the scientists reported. Noise from air turbulences around the plane is in some ways more disturbing than the noise from the propeller itself. The interior of a glider plane, for example, is a very noisy place when traveling at 150 miles per hour. Conversation is difficult if not impossible.

Several methods were suggested for overcoming the distracting noises of combat flying.

"Judicious use of sound treatment in the plane, conversion to high-fidelity microphones and earphones, and the development of acoustic devices to shield the mouth and the ears of the personnel," Prof. Miles said, "will permit the aviator to carry on in the best noises which the aeronautical engineers are now planning to produce."

Science News Letter, February 6, 1943

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AERONAUTICS—PHYSIOLOGY

Cooperation in Design

Engineer and biologist must work together if men are to be successful in handling the formidable airplanes now possible.

➤ ENGINEER and biologist must cooperate if human beings are to be really successful in handling the formidable flying machines which aeronautical invention has given them, Prof. D. W. Bronk, University of Pennsylvania biophysicist, told his audience at a lecture sponsored by the national science honor society, Sigma Xi. The biologist, and in particular the biophysicist, has as his task the discovery of the performance limits of the units of the human nervous system. The engineer must adapt his machine to a controlling organism operating within those limits.

As an example of these performance limits, Prof. Bronk cited the now familiar "blackout" experienced by dive bombers in pulling out of a steep, fast dive. It is known that the centrifugal effect of this sudden upswerve drains the blood away from the brain, and "blackout" results.

Basic reason for this momentary unconsciousness, the speaker revealed, is oxygen starvation on the part of the brain cells. Brain cells are at all times very greedy for oxygen; they never have more than a few seconds' supply on hand. So anything that cuts off fresh supplies, even for a little while, creates a physiological crisis—threatens a shutdown for lack of an essential material.

Prof. Bronk described some of the exceedingly delicate instruments used in modern physiological research to obtain data on the needs and capacities of nerve and brain cells. The brain cells' chronic state of incipient oxygen starvation was discovered by means of a microscopic metallic electrode that can be inserted into various regions of the nervous system with relatively little damage. Differences in the minute electrical current transmitted tell tales of fluctuations in amount of oxygen present, and hence of the relative state of efficiency of the cell at the moment.

Nerve cells can be isolated, yet kept alive, and thus studied as single units,

Prof. Bronk told his audience. Thus isolated, their structure can be analyzed by new electrical, optical and electron-microscopic methods. The electron microscope gives new vistas into the molecular architecture of the cell. The electrical states tell of its internal responses to fluctuations in the supply of essential elements such as calcium and phosphorus, and other environmental influences.

Science News Letter, February 6, 1943

BOTANY

Seedless Tomatoes

Number One victory vegetable produced in more attractive form by plants fumigated with growth-promoting acid.

➤ TOMATOES, the Number One victory vegetable, can be induced to produce seedless, more solidly meaty fruits by treating the plants with the fumes of a growth-promoting acid, naphthoxyacetic acid, at or before the time the flowers open. Experiments along these lines, which may have important horticultural applications, were performed in the greenhouses of the great experimental farm of the U. S. Department of Agriculture at Beltsville, Md., by Dr. John W. Mitchell and Muriel R. Whitehead of the Bureau of Plant Industry. (*Botanical Gazette*).

Use of growth-promoting chemicals to induce formation of seedless tomatoes and other fruits had already been reported by other researchers. However, their methods involved the use of sprays, or even direct application of the substances to the flower-parts with brushes or by other hand means. Getting similar results merely by subjecting plants temporarily to self-distributing fumes from a few milligrams of the acid obviously saves a great deal of time and labor in the treatment.

In their experiments, Dr. Mitchell and Miss Whitehead placed a number of tomato plants in a closed chamber, so that the exact concentration of the fumes could be measured. They used 250 milligrams (1/120 troy ounce) of beta-naphthoxyacetic acid per thousand cubic feet of room space, evaporating it on a hot glass plate over an electric heater. After exposure to the fumes overnight, the plants were taken back to the greenhouse, where an equal number of untreated plants were placed with them for comparison purposes.

As the flowers opened, both treated and untreated plants were all carefully hand-pollinated. When the tomatoes were mature, they were compared for flavor, vitamins and total mineral content. Except for the fact that the tomatoes from the treated plants were nearly or quite seedless, no difference could be detected between the two lots.

Science News Letter, February 6, 1943

ENGINEERING

Tenth of Fuel Oil Saved By Thermostat Setback

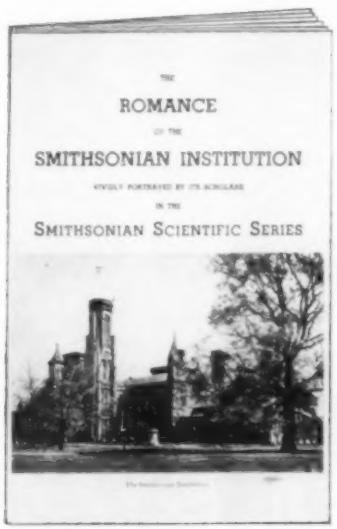
➤ HOME OWNERS can save about a tenth of their fuel oil by setting back the thermostat 6 to 10 degrees Fahrenheit at night, probably the practical limit for thermostat setback except in the most severe climates.

This estimate was obtained from tests at the University of Illinois Research Home and reported to the meeting in Cincinnati of the American Society of Heating and Ventilating Engineers by Prof. A. P. Kratz, W. S. Harris and Prof. M. K. Fahnestock.

Approximately a 10% saving in burner operating time was also obtained under test conditions of a 66-degree thermostat setting from 10 p. m. until 5:30 a. m. when the setting was restored to 72 degrees. The heating system in the Research Home, a typical well-built house, was operated with flow control valve and low limit aquastat, maintaining a minimum boiler water temperature of 165 degrees Fahrenheit. Operated without the flow control valve and aquastat, only a slight saving of fuel was effected.

Except for the warming up period in the morning, reduced night temperature has no effect on the household temperature during the day, the researchers point out. Actual cooling of temperature during the night was six degrees or less.

Science News Letter, February 6, 1943



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GEOLOGY

Blizzards Made Loess

Fine-grained loose soils, now some of nation's best farm lands, are the product of dry gray blizzards that howled off edges of glacial sheets.

➤ SOME OF the best farm lands in America are the product of unimaginably violent dust storms—dry, gray blizzards that howled off the edges of the vast glacial sheets of the pleistocene Ice Age. They are the wind-deposited soils known technically as loess, that are found over wide stretches of the Midwest and also (though more thinly deposited) in parts of the East.

Wind has long been credited with the creation of the loess, but there have been many things about this soil type that have puzzled geologists. New light is thrown on the problem by Prof. William H. Hobbs, University of Michigan geologist, as a result of long studies around the ice sheet that covers Greenland—one of the two places on earth where Ice Age conditions still persist.

During Greenland's short but often surprisingly warm summers there is very rapid melting around, and just within, the glacial margins. Heavy floods of water, turbid with suspended mud and sand, pour out, frequently floating off blocks of ice with boulders embedded in them. These eventually become stranded and melt, dropping their boulder loads at considerable distances from the edge of the main ice mass. Geologists know all this solid discharge from under the glacier edge by the vivid name of "outwash."

When the long winter sets in, bitterly cold winds, at velocities of 100 miles an hour and more, pour down off the interior of the ice sheet. The outwash is soon dried out, and the lighter particles blow outward in great clouds. Sandstorms at lower levels, dust storms at all levels, rule the season. Except for temperature, conditions are not unlike those encountered in the Libyan desert. Exposed stone surfaces are sand-blasted in almost exactly the same manner in both regions.

The outward-blowing dust is halted only by vegetation and does not, therefore, settle permanently upon the outwash plain itself. Around the outwash area it builds up a heavy deposit of the loess, which is thickest about the rim of that area and thins out the other ways. Thus it comes about that in the upper Mississippi Valley the loess has been deposited peripheral to the areas occupied by the last-ice sheet, but with an intervening area wherever there has been outwash deposited. This distribution of the loess has long been recognized by glacialists, but has never before been explained owing to the failure to take account of the so-called glacial anticyclone over continental glaciers.

Prof. Hobbs has found abundant evidence of the same state of affairs in the abundance of wind-sculptured boulders, in the inland sand dunes of Nebraska and in the distribution of the Midwestern loess which covers whole Corn-Belt counties and piles up in hills as much as 300 feet high along the Missouri.

Science News Letter, February 6, 1943

ENGINEERING

Maintenance Plan Wanted

Army officer asks industry to aid in standardizing methods to keep biggest vehicle fleet in the world operating.

➤ BIGGEST VEHICLE fleet in the world is used by the Army under severe operating conditions. But even better maintenance than is given commercial carriers on our highways is hoped for through cooperation of the automotive industry, Brigadier-General James Kirk, Ordnance Department chief of motor vehicle maintenance, told the meeting of the Society of Automotive Engineers in Detroit.

Complimenting the automotive industry on its remarkable production achievement, the speaker asked that further aid be given in developing and standardizing maintenance methods to keep the motorized Army in action. It is a problem "that can make us or break us in this war of machines," Gen. Kirk asserted.

Lists of tools should also be prepared which could be used in the maintenance of a wide variety of vehicles.

Science News Letter, February 6, 1943

Supercharger for Diesels

➤ DIESEL ENGINE power may soon be boosted by superchargers similar to those now used on plane engines. Problems involved in thus increasing our power supply were discussed at the meeting of the Society of Automotive Engineers.

A Swedish supercharger now being applied to American engines was explained in a paper prepared by Alf Lysolm of Aktiebologet Ljungstrom, Augturbin, Sweden; and Ronald B. Smith and W. A. Wilson of the Elliott Company, Jeanette, Pa.

Such a device now being manufactured weighs only 80 pounds and handles 400 to 500 cubic feet of air per minute. Other sizes adequate to serve the largest diesel engines can be built, the report stated.

Science News Letter, February 6, 1943

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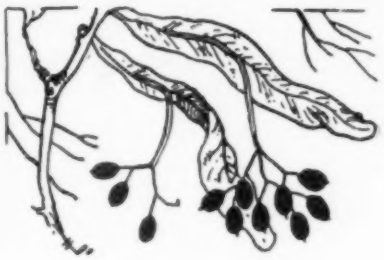
BOTANY

NATURE RAMBLINGS
by Frank Thone



Seeds in Winter

➤ WE ARE USED to thinking of winter as a time of minimum activity in the plant world; and indeed it is true that far less goes on then than in the warmer months. But we must not fall into the error of accepting it as a time of no business at all in the realm of botany, or we shall fail to see many interesting things.

Not all plants, for instance, sow their seed as soon as they are ripe, like the cottonwood in spring and the dandelion and thistle in summer. Many of them have very canny arrangements, which permit them to hang onto at least part of their seed until well into the winter, and to enlist the aid of the tumultuous winds as agents of dissemination.

Take a look at a jimsonweed or a teasel head. They split partly open when they are ripe, spilling out a share of their seeds at once. But the rest remain within the capsule, shaken out a few at a time as the high winds of late autumn and winter rattle the dry stems. If the seeds fall out during one of the fairly frequent "spells in the weather" when there is a coat of glaze-ice over the snow, the seeds have a good chance of skating many yards, perhaps even miles, before they finally stop. And of course a real blizzard, that can turn fairly heavy sand grains into stinging little missiles, can with equal ease whirl light seeds along.

Again, some trees with winged seeds, like linden and certain ash species, hang onto them like grim fate all through autumn, and do not part with them even to the winds of winter until there has been a protracted and rather severe tug-of-war. The tight-packed balls on sycamores, that bedeck the bare trees for months like Christmas-tree ornaments, take their own time about breaking up and letting the down-winged seeds drift away. You will sometimes even find thistles with part of their heads still filled with winged seeds, well into the winter. Nor are winter-shedding milkweed pods at all uncommon.

Seeds thus winter-sown are really off to a very favorable start in life. They do not mind the cold: they are all freeze-resistant and have good, solid coats able to stand a good deal of knocking about. If they fall into snow, so much the better. They will eventually settle down to earth as the snow thaws, and by that very token will have the initial supply of water they will need for prompt germination.

Science News Letter, February 6, 1943

NUTRITION

Here Are Four Signs That Mark A Good Lunch

➤ FOUR SIGNS of a good lunch, or four foods to look for as a sign that the lunch will supply, as it should, one-third of the day's nourishment were given by Dr. Robert S. Goodhart, technical adviser of the nutrition division of the Office of Defense Health and Welfare Services, at the Congress of Industrial Health sponsored by the American Medical Association in Chicago. These are:

1. Meat or a meat alternate such as cheese, eggs, beans or other legumes, or peanut butter.
2. Two vegetables, one of them green or yellow.
3. Milk as a beverage or in soup (fish chowders or vegetable cream soups) or in dessert.
4. Enriched or whole wheat bread with butter or oleomargarine fortified with vitamin A.

A possible fifth food to look for would be a source of Vitamin C. This should be raw fruit or raw vegetables or salad greens. Don't rely on cooked foods at lunch as a source of vitamin C. Much of the vitamin may be lost in the preparation and cooking.

Cold lunches can be just as good from the nutritional standpoint as hot ones. There is nothing wrong with a properly prepared sandwich, Dr. Goodhart emphasized.

"Two sandwiches made of enriched bread with the right filling and a glass of milk make a darn good lunch," Dr. Goodhart declared.

Lunch should supply at least one-third of the vitamins, minerals, fats, proteins and carbohydrates called for by the national yardstick for good nutrition. Industrial works and plants that have cafeterias, canteens or lunchrooms, however, should aim at making lunch and the mid-shift refreshment supply two-thirds of the day's nourishment, Dr. Goodhart urged. This is particularly important when workers must travel long distances to and from work and have difficulty in getting a good breakfast.

Science News Letter, February 6, 1943

DOCUMENTATION

Records of Linnaeus Recorded on Microfilm

➤ INSURANCE against war loss of the world's basic botanical and zoological data has been taken out through the recording on microfilm of all extant specimens in the collections made about 200 years ago by the famous Swedish naturalist, Carolus Linnaeus, together with all his notes, manuscripts and hand-annotated published works now in possession of the Linnean Society of London. Of the several sets of microfilm rolls, two were earmarked for deposit in the United States, one going to the Smithsonian Institution and the other to Harvard University (*Science*, Jan. 29).

Linnaeus instituted the system of naming and describing plants and animals still used by all students of the life sciences, and the first thing that must be done in naming a new species or checking the authenticity of an old one is to consult the Linnean record. For this reason, the existence in this country of two complete sets of everything Linnaeus ever did will be of extreme importance to botanists and zoologists when the normal course of scientific research can be resumed.

The microfilming of the Linnean collections was undertaken by the Linnean Society of London, under a grant from the Carnegie Corporation of New York.

Science News Letter, February 6, 1943

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• New Machines and Gadgets •

⚙ *AN ADJUSTABLE SEAT has been designed which will insulate the pilot from vibrations of his plane. Rubber bushing units in the pivotal seat supports are said to insulate both dominant and stray vibration impulses acting in any direction.*

Science News Letter, February 6, 1943

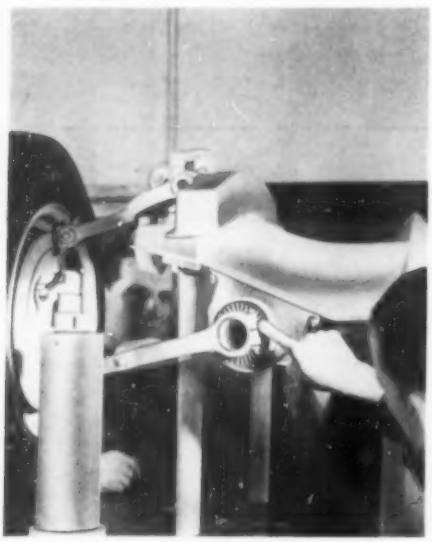
⚙ *A NEW ALARM of especial value during war has been developed to detect fires. Models have been designed for both industrial and home use. The device consists essentially of two metal plates anchored to a plastic holder. A thin "flash" plate is sensitive to small, rapid temperature changes, although seasonal or other slow temperature elevations do not set off the alarm. The other plate is designed to detect smoldering fires to which the "flash" plate would not react. Applications include detection of dangerous heat in dynamos, transformers, and other equipment, the manufacturer states.*

Science News Letter, February 6, 1943

⚙ *A COMBINATION CIGARET container, lighter and dispenser has been patented recently. It is especially adapted for installing in autos. The compact unit can be easily filled and dispenses lighted smokes one at a time.*

Science News Letter, February 6, 1943

⚙ *RUBBER SPRINGS are now being used on U. S. amphibian combat vehicles. The space between a steel cylinder and shaft is filled with rubber, as shown in the picture. Either the shaft or cylinder is held in fixed position and the other member connected to the wheels by the arms. Springing is accomplished by the twisting movement in the rubber. Since the spring was originally developed for autos, it is likely that the new device will be a part of postwar cars.*



Science News Letter, February 6, 1943

⚙ *A TOUGH "SKIN" on steel war implements can be produced by electrical induction. This heat treatment hardens certain parts of the drive gear on a tank, for example, while the remainder stays ductile to avoid fracturing.*

Science News Letter, February 6, 1943

⚙ *A WEATHERPROOF 200-watt lamp is guaranteed against cracking, due to climatic conditions, even when used outdoors in an open fixture.*

Science News Letter, February 6, 1943

⚙ *AN IMPROVED rubber tread for airplane tires gives added traction for icebound landing fields by means of many flexible, finger-like projections which resist side-skidding.*

Science News Letter, February 6, 1943

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington, D. C., and ask for Gadget Bulletin 142.*

The rapid decline in the death rate from pneumonia in recent years is largely due to the more extensive use of *sulfa drugs.*

• Just Off the Press •

THE AIRCREWS' BOOK OF PRACTICAL MATHEMATICS—P. H. Robinson—*Chemical Publishing co.*, 149 p., illus., $1.50.

BIOLOGY SEASON BY SEASON: For Catholic Schools—Mary Anthony Payne—*American Book co.*, 675 p., illus., $2.32. Textbook.

CHEMICAL-TECHNICAL DICTIONARY: German-English-French-Russian — A. W. Mayer—*Chemical Publishing co.*, 872 p., $8. Translation under the direction of B. N. Menshutkin and M. A. Bloch.

DOWN-EAST SPIRITUALS AND OTHERS — collected and edited by George Pullen Jackson—*Augustin*—296 p., illus., $5.50. "300 songs supplementary to the author's Spiritual Folk-songs of early America."

ELEMENTS OF MINERALOGY: Emphasizing the Variations in Minerals — Alexander Newton Winchell—*Prentice-Hall*, 535 p., illus., $5.

HANDBOOK OF MICROSCOPIC CHARACTERISTICS OF TISSUES AND ORGANS—Karl A. Stiles—*Blakiston*, 204 p., illus., $1.50, 2d ed.

THE JAPANESE—John F. Embree—*Smithsonian Institution*, 42 p., illus., Free upon direct application to Smithsonian (Smithsonian Institution War Background Studies Number Seven).

A MANUAL OF MATHEMATICS FOR PROSPECTIVE AIR CORPS CADETS — C. V. Newson and Harold D. Larsen—*University of New Mexico press*, 105 p., illus., paper ed., $1.35; cloth, $1.55.

MAN'S PHYSICAL UNIVERSE: A Survey of Physical Science for Colleges—Arthur T. Bawden—New York, *Macmillan*, $4.

MIRACLES OF MILITARY MEDICINE—Albert Q. Maisel—*Duell, Sloan and Pearce*—373 p., $2.75.

NAVAL WARFARE: An Introductory Study — John Creswell — *Chemical Publishing co.*, 302 p., maps, $4. 2d revised edition.

NUTRITION AND FOOD SUPPLY: THE WAR AND AFTER—John D. Black, editor—*American Academy of Political and Social Science*—279 p., $2, paper; $2.50, cloth. (The Annals of the American Academy of Political and Social Science, Volume 225).

THE OBSERVER'S BOOK ON ASTRO-NAVIGATION—Francis Chichester—*Chemical Publishing co.*, 84 p., illus., $1.50. Parts 3 and 4.

THE OBSERVER'S HANDBOOK ON AIRCRAFT INSTRUMENTS—W. J. D. Allan—*Chemical Publishing co.*, 102 p., illus., $1.50.

ORGANIC CHEMISTRY—G. Albert Hill and Louise Kelley—*Blakiston*—919 p., illus., $4. Textbook.

THE PSYCHOLOGY OF MILITARY LEADERSHIP — L. A. Pennington, Romeyn B. Hough, Jr., and H. W. Case—*Prentice-Hall*, 288 p., $2.95.

SAVE FUEL FOR VICTORY — University of Illinois Engineering Experiment Station—*University of Illinois*—35 p., 25c. (University of Illinois Engineering Experiment Station Circular Series No. 47).

THE STARS IN MYTH AND FACT—Oral E. Scott—*Caxton Printers*, 374 p., illus., $3.

TEXTILES—William H. Dooley—*Heath*, 790 p., illus., $4. New edition.

UPPER CRETACEOUS FLORAS OF THE ROCKY MOUNTAIN REGION—Erling Dorf—*Carnegie Institution*—168 p., 36 plates, $2.50; paper cover, $3.00, cloth binding. (Contributions to Paleontology.

YOUR HOUSE: Its Upkeep and Rejuvenation—J. Harold Hawkins—*Barrows*, 224 p., illus., $2.50.

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